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The Trustees of Princeton University

UNITED STATES DISTRICT COURT FOR
THE DISTRICT OF NEW JERSEY

**THE TRUSTEES OF PRINCETON
UNIVERSITY,**

Plaintiff

v.

**TOD WILLIAMS BILLIE TSIEN
ARCHITECTS, LLP; JACOBS
ARCHITECTS/ENGINEERS, INC.;
and JACOBS CONSULTANCY INC.**

Defendants

**AFFIDAVIT OF MERIT BY
CHESTER T. VOGEL, P.E.
IN SUPPORT OF THE TRUSTEES
OF PRINCETON UNIVERSITY'S
CLAIMS AGAINST JACOBS
ARCHITECTS/ENGINEERS, INC.**

STATE OF MASSACHUSETTS)
) SS:
COUNTY OF BERKSHIRE)

NOW COMES Chester T. Vogel, P.E., having been duly sworn according to law, and upon my own knowledge, information or belief and so far as upon such knowledge, information and belief, I depose and state as follows:

1. I have personal knowledge and I am competent to testify as to all matters contained herein.

2. I am a licensed professional engineer in the State of New Jersey, License #24GE02567300, and have been a licensed professional engineer in the State of New York since 1968, License #044122. I received a Bachelor of Mechanical Engineering degree from Rensselaer Polytechnic Institute in 1958 and have extensive education, training, and experience in the practice of mechanical and electrical engineering, including the design of heating, ventilating, air conditioning (HVAC), plumbing, fire protection, lighting, power and fire alarm systems (MEPS). I am also certified by the National Council of Examiners for Engineering (NCEES) and the National Academy of Forensic Engineers (NAFE), and a Fellow of the American Council of Engineering Companies (ACEC).

3. I have over fifty years of experience as a licensed engineer in the practice of engineering, performing design, preparation of construction documents, and construction administration in both the public and private sector for architects, and for governmental, institutional and commercial clients. On many of these projects I have been associated with other professional service consultants, including laboratory, kitchen, acoustics and audio-visual consultants, wherein I coordinated my professional services with these consultants.

4. My education, training, and experience includes the design of MEPS systems for educational and healthcare buildings, including laboratories. A true, accurate, and complete copy of my Curriculum Vitae (CV), listing some of my education, training, experience, and qualifications is attached hereto and incorporated herein as Exhibit 1.

5. Prior to establishing my own firm, C.T. Vogel, P.E. Consulting Engineer (CTVPE) in 1985, for more than 20 years, I held positions as Project Manager; Mechanical Design Engineer; Director of Engineering and Partner-In-Charge of projects with Kallen & Lemelson Engineers.

The following is a brief summary of some of the more significant laboratory projects that I have designed:

Kallen & Lemelson Engineers - Partner (1970-1985)

- 1970-1975: Chemistry and Chemical Engineering Building, Stephens Institute of Technology, Hoboken, NJ
- 1970-1980: Alzheimer Research Laboratory Projects, including Animal Labs, Burke Medical Research Institute, White Plains, NY
- 1980-1985: Low Center for Industrial Innovation Laboratories, Rensselaer Polytechnic Institute, Troy, NY

C.T. Vogel P.E. Consulting Engineer (1985-Present)

- 1986-1987: Laboratory Building Addition, Burke Medical Research Institute, White Plains, NY
- 1988-1990: Delaware Public Health Laboratory, Smyrna, DE (received ACEC NY Design Award)
- 1990-2004: Laboratory Renovation Projects – Hospital for Special Surgery & William Black Medical Research Building, New York City
- Forensic Practice: State of New Jersey (Plaintiff) - Reviewed HVAC design for conformance with good practice as HVAC expert; Claim: Inadequate HVAC system design for Laboratory
- Forensic Practice: Porzio, Bromberg & Newman for Air Con Mechanical (Defendant) - Reviewed HVAC design and construction for conformance with code, recognized standards and good practice as HVAC expert; Claim: Improper HVAC design and

construction resulted in unsatisfactory performance and operation for an industrial research and development laboratory.

6. I am currently self-employed as a MEPS consultant and forensic consultant for C.T. Vogel P.E. Consulting Engineer, providing professional MEPS design and consulting services for commercial projects, and technical investigations, analysis, reports, and testimony toward the resolution of litigation involving construction claims and engineering professional liability, and have no financial interest in the outcome of this matter.

7. As a licensed professional engineer, I am often called upon to analyze, interpret, and apply various building codes and industry standards to the design and construction of building mechanical and electrical systems, including those utilized for residential, commercial, educational and institutional purposes. As noted in my CV, I have special expertise in the writing and interpretation of building codes for Mechanical, HVAC and Boiler systems.

8. I have read and reviewed The Trustees of Princeton University's Complaint (Princeton) against Jacobs Architects/Engineers, Inc. (Jacobs A/E) concerning the professional design services it provided for the design and construction of the cleanrooms in The Andlinger Center for Energy and the Environment (Andlinger). The cleanrooms in Andlinger are laboratories free from dust and other contaminants used chiefly for the manufacture and scientific research of electronic components. I have also read and reviewed extensive project documentation related to the design and construction of Andlinger, including the construction document plans and specifications, supplemental instructions issued during construction, multiple change order requests, shop drawings, Jacobs A/E's contract, and the project design timeline.

9. According to its contract, Jacobs A/E agreed to provide cleanroom consulting and architectural services for all clean and non-clean support areas for Andlinger, in approximately 25,000 square feet in a building of approximately 125,000 square feet (GSF). Jacobs A/E was,

therefore, responsible for about 20% of the project's design and related construction, and together with Jacobs Consultancy, Inc. (Jacobs), about 60% of the project's overall design and related construction.

10. Jacobs A/E's performance violated the contract requirements for the project schedule milestones. This was a significant link in a chain of events that resulted in increased costs to Princeton because of delays and additional work.

11. Jacobs A/E's continued lack of performance included the release of cleanroom design documents and drawings which were incomplete and not coordinated with the architect, Todd Williams Billie Tien Architects, LLP (TWBTA). The design documents and drawings for the cleanroom were issued to the MEPS design consultant, Arup USA, Inc. (Arup), after the milestone dates. Jacobs A/E's failure to timely issue the design documents and drawings for the cleanroom impacted critical path milestone dates for the construction documents, prevented the timely commencement of the project and increased costs to Princeton because of delays and additional work.

12. Excessive cleanroom design drawings and specifications that Jacobs A/E issued after the Construction Manager, F.J. Sciamé Construction Co., Inc. (Sciamé), established the GMP and during the construction phase violated the standard of care and resulted in increased costs to Princeton because of delays and additional work.

13. The extensive number of cleanroom design drawings and specifications that Jacobs A/E issued during construction and after the issuance of the consolidated set of construction documents, required an excessive number of Architect's Supplemental Instructions (ASI's) to be issued to Sciamé, kept the project in a constant state of redesign, violated the standard of care and resulted in increased costs to Princeton because of delays and additional work.

14. Jacobs A/E failure to properly execute the cleanroom design drawings and specifications resulted in errors and omissions, resulted in change orders, violated the standard of care and resulted in increased costs to Princeton because of delays and additional work.

15. Jacobs A/E's excessive number of changes to the cleanroom design drawings and specifications during construction and after its issuance of the consolidated set of construction drawings required Sciame and its Contractors to make numerous updates to the BIM Construction Model. This process, which was very inefficient, resulted in seven BIM related change orders for additional cost to Princeton and resulted in a delayed schedule for the project completion.

16. Based upon my knowledge of the facts in this matter as documented to date, in my professional opinion there exists reasonable probability that the care, skill, and knowledge exercised or exhibited by Jacobs A/E in rendering professional cleanroom consulting services to Princeton University and referred to in the complaint fell outside the acceptable standard of care for licensed design professionals in New Jersey.



A handwritten signature in blue ink, appearing to read "CT Vogel", written over a horizontal line.

Chester T. Vogel, P.E.

Sworn to before me this
18 day of March 2020.

A handwritten signature in black ink, appearing to read "Louise A. Naventi-Lucchesi", written over a horizontal line.

Notary Public – State of Massachusetts

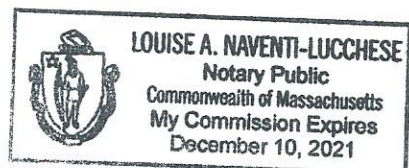


Exhibit 1

Curriculum Vitae of Chester T. Vogel, P. E.